John Coakley Lettsom, M.D. F.R.S. &c, the following ſhort Eſsay is respectfully presented by
The Author.

MEMOIR

ON THE EXTRANEOUS FOSSILS,

DENOMINATED

MAMMOTH BONES;

PRINCIPALLY DESIGNED TO SHEW,

THAT THEY ARE THE REMAINS OF MORE THAN
ONE SPECIES OF

Non-Deſcript Animal:

Read before the A. P. S. July 21st 1797.

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BRITISH MUSEUM

MEMOIR, &c.

THE intereſting remains which form the ſubject of this Memoir, have excited various conjectures concerning their nature and origin. By ſome they were thought to be mineral ſubſtances; and by others, animal. The latter opinion ſoon prevailed, and is now univerſally received.

But another queſtion remained to be anſwered:—To what animal, or claſs, were the bones to be aſſigned? Here was a difficulty not ſo eaſy to overcome. It engaged the attention and drew forth the labours of ſeveral eminent men. Some aſcribed them to the elephant;[*] others to the hippopotamus; and others, again, to ſome unknown creature, larger than either, and of the carnivorous kind.[†] To this animal incognitum common conſent has given the name of Mammoth.[‡]

Depoſits of his remains are very frequently found in Siberia and other parts of the old world. In North Ame-

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[*] As Sir Hans Sloane, Gmelin, Daubenton, Buffon, &c. Buffon, however, admits that they beſpeak an animal whoſe cubic volume muſt have exceeded, by five or ſix times, that of the elephant.

[†] Dr. Wm. Hunter. *Vide* Tranſ. Roy. Soc. vol. LVIII. p. 42: alſo "Notes on Virginia."

[‡] Strahlenberg, in his Hiſtorico-Geographical Deſcription, obſerves, that the Ruſſian name is *Mammoth;* which is a corruption from *Memoth*, a word derived from the Arabic, *Mehemot*, ſignifying the ſame as the *Behemot* of Job. This word is applied to any animal of *extraordinary* bigneſs: for inſtance, *Fyhl* is the Arabic appellation for an elephant of ordinary ſize; but when of uncommon magnitude, the adjective *Mehemodi* is always added.

rica they are abundant. The countries bordering upon the Ohio and its tributary ſtreams, have already furniſhed numerous diſcoveries of the kind; and, it is ſaid, the banks of the Miſſouri, alſo, abound with them.

Nature having bleſſed our tranſmontane regions with a bountiful ſupply of ſalines, or ſprings of ſalt water; the earth there being ſoft or ſpongy and impregnated with mineral ſalts, is rendered peculiarly fit for the reception and preſervation of certain bodies which, in other places, would undergo a ſpeedy decay. Hence the profuſion of Mammoth bones beyond the mountains; while on the Atlantic ſide of them, where ſalines are ſcarce, ſuch remains have but rarely been found:—I ſpeak here comparatively.

Hitherto but few of the remains in queſtion have appeared to the ſouthward of the 36th. degree of north latitude: and hence an opinion, that the Mammoth was not an inhabitant of the warmer climates. The ingenious author of "*Notes on Virginia*" ſeems to be influenced by this belief when, alluding to ſome diſcoveries made farther ſouth, he obſerves, —" They are either ſo looſely mentioned, as to leave a doubt of the fact; ſo inaccurately deſcribed, as not to authorize the claſſing of them with the great northern bones; or ſo rare, as to found a ſuſpicion that they have been carried thither, as curioſities, from more northern regions."

Since the publication of the "Notes," however, at leaſt one additional fact has occurred, that favours the aſſigning of a *wider* range to this incognitum: for, in cutting the Santee and Cowper river canal in South-Caroſina, there was lately turned up a collection of bones, anſwering by deſcription to thoſe of the Mammoth. Their number, variety, and arrangement were ſuch, as forcibly to preclude the idea of their having been "carried thither as curioſities."*

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* Since writing this paper, ſimilar remains have been diſcovered at Wilmington and near Newbern, both in North-Carolina and without the limits above ſuggeſted for the reſidence of the Mammoth.

The late Dr. W. Hunter was the firſt to relieve the learned from an error they had long indulged. Having carefully compared a few ſpecimens of the American bones with others of the Siberian non-deſcript, and theſe again with ſimilar parts of the elephant, hippopotamus, &c. he became convinced, that the two firſt were veſtiges of one and the ſame ſpecies of animal; but differing eſſentially in ſize and form from the bones of any other at preſent known to us: that, conſequently, they were not parts of the elephant, nor of the hippopotamus; but of ſome huge carnivorous animal.*

Had the opportunities of this accurate obſerver been greater than it appears they were; or, in other words, had his materials been leſs ſcanty, he would have diſcerned the remains of a ſecond incognitum, whoſe ſtature was not, perhaps, inferior to that of the other. Theſe ſecond remains evince a member of the *herbivorous* order; and, from their extraordinary ſize, I have no heſitation in believing, that they belonged to ſome link in the chain of animal creation, which, like that of the Mammoth, has long been loſt.†

Both ſkeletons of theſe incognita being uſually embedded in company, they have hitherto been confounded together by writers, under the ſingle appellation of Mammoth bones.

The parts which more decidedly mark the remains of a ſecond animal, conſiſt, firſt, of a grinder excluſively worn by thoſe of the herbivorous or graminivorous kind; and, ſecondly, of two tuſks *(defenſes)* differently faſhioned.

Although I do not preſume to aſſert, that, contrary to the received opinion, neither of theſe tuſks belonged to the Mammoth: yet if the nature of his purſuits be conſidered, taking it for granted, as I ſhall endeavour to ſhew, that he was partly (if not wholly) carnivorous;—that there is no place for their inſertion in the lower jaw, (the upper I have not ſeen) and that ſuch tuſks would appear to be incompatible with the natural purſuits of ſuch a creature—can we heſitate to aſcribe them to ſome other animal?

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* Tranſ. Roy. Soc. vol. LVIII. p. 42.

† It is with reluctance, that I feel myſelf conſtrained to offer here an opinion ſo contrary to that which has been held by two ſuch able writers as Mr. Jefferſon and Mr. Pennant.

I ſhall confine my ideas to *two* diſtinct ſkeletons only; ſince no diſcovery has yet occurred of a third tooth, or other bone, to juſtify the dividing of the tuſks between a ſecond and a third deſcription of *incognita*. I am neither prepared to admit nor deny, that *defenſes*, ſo differently faſhioned as theſe will appear, were worn by one and the ſame animal: and yet, the probability is, that neither of them belonged to the Mammoth. The difference between the *defenſes* is indeed remarkable. One of them, the longer of the two, bears a near reſemblance, in ſize, form and ſubſtance, to the tuſk of an elephant: the other deſcribes a greater curve, and is ſo flattened or compreſſed on two oppoſite ſides, in its whole length, as to produce a greater breadth than thickneſs, in the proportion of about two parts and a half to one. The curvature inclines on the edges; that is, the tuſk is bent edgewiſe. Both *defenſes* are good ivory.

With reſpect to the teeth, all that I have ſeen of either kind are *dentes molares*. They unqueſtionably beſpeak the remains of two diſtinct ſpecies of non-deſcript animals; the one carnivorous, or mixed; the other herbivorous, or graminivorous.

The maſticating ſurface of the Mammoth tooth is ſet with four or five high double-coned proceſſes, ſtrongly coated with enamel: whereas that of the other *incognitum* is flat, nearly ſmooth, and ribbed tranſverſely, ſomewhat like the elephant's grinder, but leſs prominently marked. The writer has counted from fifteen to twenty of theſe tranſverſe lines on a ſingle tooth of this ſecond *incognitum*; while on that of the elephant, they ſeldom exceed half the number.

The lower jaw of the Mammoth is furniſhed with four teeth, two on each ſide; and being unaſſociated either with *inciſores* or *canini*, it may reaſonably be inferred, that this animal was of a nature not wholly carnivorous, but mixed.

Another part of what we term Mammoth remains, conſiſts of fragments of ribs of a ſingular conſtruction; being all bent on the edge. Such a form is eminently calculated for ſtrengthening a frame which, perhaps, was ordained to ſubſiſt by the deſtruction of other animals, both active and powerful.

I ſhall take the liberty to give, in this place, the ſubſtance of a few obſervations made by certain writers concerning the Mammoth ſkeleton. It may aſſiſt us in forming ſome idea of the uncommon ſtature of the animal.

In the Memoirs of the American Academy of Arts and Sciences, vol. II. part 1ſt, there is a deſcription of a tuſk found ſeveral years ago in the river Chemung, or Tioga, a branch of the Suſquehannah. It was ſix feet nine inches long, twenty-one inches around at the larger end and fifteen at the ſmaller; and was incurvated nearly into the arc of a large circle. This, however, was but a fragment; for it appeared as if the length of two or three feet had periſhed at each end.

Strahlenberg* relates, that an entire ſkeleton of the Mammoth was diſcovered in Siberia, near lake Tzana Oſero; that it meaſured thirty-ſix Ruſſian ells in length;† and ſo great was the diſtance between the oppoſite ribs, that a man ſtanding upright on the concavity of a rib, as the ſkeleton reſted on its ſide, could not quite reach the oppoſite one, though with the aid of a pretty long battle axe which he held in his hand. This account is given as coming from the mouth of the man himſelf, and who was one of thirty others, all eye witneſſes to the fact. Strahlenberg then obſerves, that a Doctor Meſſerſchmidt had ſeen the bones of a whole ſkeleton of a monſtrous ſize, lying in a heap in a ditch between Tomſkoi and Kaſnetſko, on the banks of the river Tomber. He next tells us what he himſelf had ſeen. He ſaw, at the city of Tumeen, a ſkull of the Mammoth, two ells and a half in length: but this the Ruſſians informed him was one of the ſmalleſt ſize. He had alſo ſeen Mammoth tuſks, each upwards of four Ruſſian ells in length, and nine inches in diameter at the thick end.

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* Hiſtorico-Geographical Deſcription of the North and Eaſtern Parts of Europe and Aſia, p. 104.

† The Ruſſian ell is equal to $28\frac{1}{10}$ inches Engliſh.

It is to be regretted, that the world has not yet been favoured with a particular and ſcientific deſcription of the whole ſkeleton of an *incognitum* ſo intereſting as the Mammoth. Both Muller and Iſbrandes Ides, indeed, have gone ſo far, as to deſcribe his ſtructure, ſize, colour, &c. But what credit can be given to ſuch idle ſtories, when Ides himſelf confeſſes, that he knew of no perſon who had ever ſeen a living Mammoth? The perſon who ſhall firſt procure the complete ſkeleton of this *incognitum*, will render,—not to his country alone, but to the world,—a moſt invaluable preſent.*

In my mind it is highly probable, that both ſpecies of *incognita* in queſtion, have long ſince periſhed. This opinion derives countenance from ſeveral diſcoveries of other foſſil bones, in Germany, in South-America, and in Virginia. We are now acquainted with the ſkeletons of five ſeveral large animals, all of whom are, at preſent, unknown: and as two of thoſe ſkeletons* were but recently brought to light, may we not expect to be gratified, in theſe times of reſearch, with other diſcoveries of a ſimilar kind? Can we believe, then, that ſo many and ſuch ſtupendous creatures could exiſt for centuries and be concealed from the prying eye of inquiſitive man?

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* I have often expreſſed a belief, that whenever the entire ſkeleton ſhould be found, it would appear to have been armed with claws. I am now more confirmed in the opinion; for after this Memoir was written, the Society received a collection of the bones here treated of, and among them the os calcis, or heel bone, of a *clawed* animal.

The benevolent perſuaſion, that no link in the chain of creation will ever be ſuffered to periſh, has induced certain authors of diſtinguiſhed merit,† to provide a reſidence for our Mammoth in the remote regions of the north. Some of the North American Indians alſo believe in the now exiſtence of this animal, and place him far beyond the lakes. But their belief reſts on mere tradition: for none of them will venture to declare they have ſeen the animal themſelves, or that their information concerning him, is drawn from any perſon who had. Their tradition is to this effect. "In ancient times," ſay they, "a herd of Mammoths "came to the Great-Bone Lick, and began a univerſal de-"ſtruction of the bears, deer, elks, buffaloes and other "animals. It ſo provoked the Great Man above to ſee the "havoc thus ſpread among creatures deſigned for the uſe "of his favourite Red Men, that he killed all the Mam-"moths except the big bull, who fled wounded beyond "the lakes, where he is living to this day."

There is little or no dependence to be placed on Indian traditions. They are ſo clouded with fable, as to obſcure any truths they may happen to contain. The above tradition, indeed, is not exactly of this deſcription, though it partakes largely of the fabulous: There is a truth in it, which my perſonal acquaintance with the Great-Bone Lick

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* The ~~[illegible]~~ Megatherium of Paraguay: alſo certain large bones found in a nitrous cavern in Virginia, and preſented to our ſociety by its worthy Preſident.

† Pennant. Jefferſon.

has enabled me to detect. As it will furniſh a corroborative preſumption, if not a proof, that the Mammoth was carnivorous, or partly ſo, at leaſt, I ſhall proceed to ſome obſervations on certain appearances at that ſaline, and which muſt have been familiar to the ſavages themſelves. —I mean collections of bones of the various animals mentioned in the tradition.

The Great-Bone Lick is a ſhallow ſtream of ſalt water flowing into the Ohio. Upon either margin of the ſtream there lies a *ſtratum*, extending a conſiderable diſtance, compoſed entirely of the bones of the buffalo and other ſmaller animals noticed in the tradition above, From the effect of the mineral ſalt, theſe remains were in a ſtate of high preſervation—But, judge of my ſurprize, when attentively examining them, I diſcovered, that almoſt every bone of any length had received a fracture, occaſioned, moſt likely, by the teeth of the Mammoth, while in the act of feeding on his prey.

It is well known that the buffalo, deer, elk and ſome other animals, are in the conſtant habit of making ſuch places their reſort; in order to drink the ſalt water and lick the impregnated earth. Now, may we not from theſe facts infer, that Nature had allotted to the Mammoth the beaſts of the foreſt for his food? How can we otherwiſe account for the numerous fractures that every where mark theſe *ſtrata* of bones? May it not be inferred, too, that as the largeſt and ſwifteſt quadrupeds were appointed for his food, he neceſſarily was endowed with great ſtrength and activity?—that, as the immenſe volume of the creature would unfit him for courſing after his prey through thickets and woods, Nature had furniſhed him with the power of taking it by a mighty leap ?—That this power of ſpringing to a great diſtance was requiſite to the more effectual concealment of his bulky volume while lying in wait for prey ? The Author of exiſtence is wiſe and juſt in all his works. He never confers an appetite without the power to gratify it.

With the agility and ferocity of the tiger ; with a body of unequalled magnitude and ſtrength, it is poſſible the Mammoth may have been at once the terror of the foreſt and of man !—And may not the human race have made the extirpation of this terrific diſturber a common cauſe ?

G. TURNER.

Philadelphia, July 20th, 1797.

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